**State, ACT, and Common Core Standards Alignment**

**Standards to Use for Common Benchmark Assessment Development**

**Unit 1 & Unit 2**

| ***Tennessee Standards*** | **ACT Standards** | **Common Core Standards** | |
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| **3108.1.3** Comprehend the concept of length on the number line. | **Measurement, 13-15**: Estimate or calculate the length of a line segment based on other lengths given on a geometric figure |  |
| **3108.1.4** Recognize that a definition depends on undefined terms and on previous definitions. | **Properties of Plane Figures, 33-36:** Draw conclusions based on a set  of conditions |  |
| **3108.1.1** Check solutions after making reasonable estimates in appropriate units of quantities encountered in contextual situations. |  |  |
| **3108.4.22** Perform basic geometric constructions using a straight edge and a compass, paper folding, graphing calculator programs, and computer software packages (i.e., bisect and trisect segments, congruent angles, congruent segments, a line parallel to a given line through a point not on the line, angle bisector, and perpendicular bisector). |  |  |
| **3108.4.3** Solve problems involving betweeness of points and distance between points (including segment addition). |  | **Geometry, Congruence**: 9) Prove theorems about lines and angles. |
| **3108.4.4** Describe and recognize minimal conditions necessary to define geometric objects. |  |  |
| **3108.4.5** Use vertical, adjacent, complementary, and supplementary angle pairs to solve problems and write proofs. | **Properties of Plane Figures, 24-27**: Use several angle properties to find an unknown angle measure |  |
| **3108.1.4** Recognize that a definition depends on undefined terms and on previous definitions. |  |  |
| **3108.4.2** Compare and contrast inductive reasoning and deductive reasoning for making predictions and valid conclusions based on contextual situations. |  |  |
| **3108.4.4** Describe and recognize minimal conditions necessary to define geometric objects. |  |  |
| **3108.4.5** Use vertical, adjacent, complementary, and supplementary angle pairs to solve problems and write proofs. |  |  |
| **3108.4.6** Describe the intersection of lines (in the plane and in space), a line and a plane, or of two planes. |  |  |
| **3108.4.15** Identify, write, and interpret conditional and bi-conditional statements along with the converse, inverse, and contra-positive of a conditional statement. |  |  |
| **3108.4.16** Analyze and create truth tables to evaluate conjunctions, disjunctions, conditionals, inverses, contra-positives, and bi-conditionals. |  |  |
| **3108.4.17** Use the Law of Detachment, Law of Syllogism, conditional statements, and bi-conditional statements to draw conclusions. |  |  |
| **3108.4.18** Use counterexamples, when appropriate, to disprove a statement. |  |  |
| **3108.1.6** Use inductive reasoning to write conjectures and/or conditional statements. |  |  |

**Unit 3 & Unit 4**

| ***Tennessee Standards*** | **ACT Standards** | **Common Core Standards** | |
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| **3108.3.1** Prove two lines are parallel, perpendicular, or oblique using coordinate geometry. |  |  |
| **3108.3.2** Connect coordinate geometry to geometric figures in the plane (e.g. midpoints, distance formula, slope, and polygons). |  | **Geometry, Expressing Geometric with Equations:** 4) Use coordinates to prove simple geometric theorems algebraically.  5) Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (for example, find the equation of a line parallel or perpendicular to a given line that passes through a given point). |
| **3108.4.7** Identify perpendicular planes, parallel planes, a line parallel to a plane, skew lines, and a line perpendicular to a plane. |  |  |
| **3108.4.8** Apply properties and theorems about angles associated with parallel and perpendicular lines to solve problems. | **Properties of Plane Figures, 16-19**: Exhibit some knowledge of the angles associated with parallel lines. |  |
| **3108.4.21** Use properties of and theorems about parallel lines, perpendicular lines, and angles to prove basic theorems in Euclidean geometry (e.g., two lines parallel to a third line are parallel to each other, the perpendicular bisectors of line segments are the set of all points equidistant from the endpoints, and two lines are parallel when the alternate interior angles they make with a transversal are congruent). | **Properties of Plane Figures, 20-23**: find the measure of an angle using properties of parallel lines; Exhibit knowledge of basic angle properties (e.g. 90, 180, 360) |  |
| **3108.4.22** Perform basic geometric constructions using a straight edge and a compass, paper folding, graphing calculator programs, and computer software packages (i.e., bisect and trisect segments, congruent angles, congruent segments, a line parallel to a given line through a point not on the line, angle bisector, and perpendicular bisector). |  |  |
| **3108.4.1** Recognize that there are geometries, other than Euclidean geometry, in which the parallel postulate is not true and discuss unique properties of each. |  |  |
| **3108.4.10** Identify and apply properties and relationships of special figures (e.g., isosceles and equilateral triangles, family of quadrilaterals, polygons, and solids). | **Properties of Plane Figures, 24-27**: Use properties of isosceles triangles |  |
| **3108.4.11** Use the triangle inequality theorems (e.g., Exterior Angle Inequality Theorem, Hinge Theorem, SSS Inequality Theorem, Triangle Inequality Theorem) to solve problems. |  |  |
| **3108.4.22** Perform basic geometric constructions using a straight edge and a compass, paper folding, graphing calculator programs, and computer software packages (i.e., bisect and trisect segments, congruent angles, congruent segments, a line parallel to a given line through a point not on the line, angle bisector, and perpendicular bisector). |  |  |
| **3108.4.35** Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements. |  |  |
| **3108.4.38** Use the principle that corresponding parts of congruent triangles are congruent to solve problems. |  |  |

**Unit 5**

| ***Tennessee Standards*** | **ACT Standards** | **Common Core Standards** | |
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| **3108.4.14** Identify and use medians, midsegments, altitudes, angle bisectors, and perpendicular bisectors of triangles to solve problems (e.g., find segment lengths, angle measures, points of concurrency). |  | **Geometry, Congruence**: 10) Prove theorems about triangles.  **Geometry, Congruence**: 12) Make formal geometric constructions with a variety of tools and methods (compass and straight edge, string, reflective devices, paper folding, dynamic geometric software, etc.). |
| **3108.4.11** Use the triangle inequality theorems (e.g., Exterior Angle Inequality Theorem, Hinge Theorem, SSS Inequality Theorem, Triangle Inequality Theorem) to solve problems. |  |  |

**Unit 6 & Unit 8**

| ***Tennessee Standards*** | **ACT Standards** | **Common Core Standards** | |
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| **3108.1.9** Expand analysis of units of measure to include area and volume. | **Measurement, 16-19**: Compute the area of rectangles when whole number dimensions are given.  **Measurement, 20-23**: Compute the area and perimeter of triangle and rectangles in simple problems  **Measurement, 24-27**: Compute the area of triangle and rectangles when one or more additional simple steps are required |  |
| **3108.3.2** Connect coordinate geometry to geometric figures in the plane (e.g. midpoints, distance formula, slope, and polygons). |  | **Geometry, Expressing Geometric with Equations:** 4) Use coordinates to prove simple geometric theorems algebraically.  5) Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (for example, find the equation of a line parallel or perpendicular to a given line that passes through a given point). |
| **3108.3.4** Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information in two and three dimensions. |  |  |
| **3108.4.9** Classify triangles, quadrilaterals, and polygons (regular, non-regular, convex and concave) using their properties. |  | **Geometry, Congruence**: Prove theorems about parallelograms. |
| **3108.4.19** Use coordinate geometry to prove properties of plane figures. |  | **Geometry, Congruence**: 9) Prove theorems about lines and angles. |
| **3108.4.36** Use several methods, including AA, SSS, and SAS, to prove that two triangles are similar. |  | **Geometry, Similarity, Right Triangles, and Trig.**: 4) Prove theorems about triangles. |
| **3108.4.37** Identify similar figures and use ratios and proportions to solve mathematical and real-world problems (e.g., Golden Ratio). |  |  |
| **3108.4.29** Extend the effect of a scale factor k in similar objects to include the impact on volume calculations and transformations. | **Measurement, 33-36**: Use scale factor to determine the magnitude of a size change. |  |

**Unit 9 & Unit 10**

| ***Tennessee Standards*** | **ACT Standards** | **Common Core Standards** | |
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| **3108.4.43** Apply the Pythagorean Theorem and its converse to triangles to solve mathematical and contextual problems in two- or three-dimensional situations. | Properties of Plane Figures, 24-27: Use the Pythagorean theorem |  |
| **3108.4.44** Identify and use Pythagorean triples in right triangles to find lengths of an unknown side in two- or three-dimensional situations. | Properties of Plane Figures, 24-27: Recognize Pythagorean triples |  |
| **3108.1.8** Understand how the similarity of right triangles allows the trigonometric functions sine, cosine, and tangent to be defined as ratio of sides. |  | **Geometry, Right Triangles and Trig:** 6) Understand that by similarity, side ratios in right triangles are properties of angles in the triangle, leading to definitions of trig. ratios for acute angles.  7) Explain and use the relationship between the sine and cosine of complementary angles  8) Use trig ratios and the Pythagorean theorem to solve right triangles in applies problems. |
| **3108.2.3** Recognize and apply real number properties to vector operations and geometric proofs (e.g. reflexive, symmetric, transitive, addition, subtraction, multiplication, division, distributive, and substitution properties). |  |  |
| **3108.4.27** Use right triangle trigonometry to find the area and perimeter of quadrilaterals (e.g. square, rectangle, rhombus, parallelogram, trapezoid, and kite). |  |  |
| **3108.4.30** Use right triangle trigonometry to find the lateral area (if possible), surface area, and volume of prisms, cylinders, cones, pyramids, spheres, and hemispheres. |  | **Geometry, Right Triangles and Trig:**  8) Use trig ratios and the Pythagorean theorem to solve right triangles in applies problems |
| **3108.4.45** Use the converse of the Pythagorean Theorem to classify a triangle by its angles (right, acute, or obtuse). |  |  |
| **3108.4.46** Apply properties of 30° - 60° - 90° and 45° - 45° - 90° to determine side lengths of triangles. | Properties of Plane Figures, 28-32: Apply properties of 30-60-90, 45-45-90, similar and congruent triangles |  |
| **3108.4.47** Find the sine, cosine and tangent ratios of an acute angle of a right triangle given the side lengths. |  |  |
| **3108.4.48** Define, illustrate, and apply angles of elevation and angles of depression in real-world situations. |  |  |
| **3108.4.39** Identify lines and line segments associated with circles. |  |  |
| **3108.4.40** Find angle measures, intercepted arc measures, and segment lengths formed by radii, chords, secants, and tangents intersecting inside and outside circles. | **Measurement, 28-32**: Use relationships involving area, perimeter, and volume of geometric figures to compute another measure. |  |
| **3108.4.41** Use inscribed and circumscribed polygons to solve problems concerning segment length and angle measures. |  |  |

**Unit 11 & Unit 12**

| ***Tennessee Standards*** | **ACT Standards** | **Common Core Standards** | |
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| **3108.2.1** Analyze properties and aspects of pi (e.g. classical methods of approximating pi, irrational numbers, Buffon’s needle, use of dynamic geometry software). |  |  |
| **3108.2.2** Approximate pi from a table of values for the circumference and diameter of circles using various methods (e.g. line of best fit). |  |  |
| **3108.4.12** Apply the Angle Sum Theorem for polygons to find interior and exterior angle measures given the number of sides, to find the number of sides given angle measures, and to solve contextual problems. |  |  |
| **3108.4.28** Derive and use the formulas for the area and perimeter of a regular polygon. (A=1/2 ap) | **Measurement, 16-19**: Compute the perimeter of polygons when all side lengths are the same.  **Measurement, 24-27**: Computer the perimeter of simple composite geometric figures with unknown side lengths. |  |
| **3108.5.1** Determine the area of each sector and the degree measure of each intercepted arc in a pie chart. | **Measurement, 28-32**: Use relationships involving area, perimeter, and volume of geometric figures to compute another measure. | **Geometry, Cirlces:** 5) Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius; derive the formula for the area of a sector. |
| **3108.4.23** Describe the polyhedron or solid that can be made from a given net including the Platonic Solids. |  |  |
| **3108.4.24** Develop and use special formulas relating to polyhedra (e.g., Euler’s Formula). |  |  |
| **3108.4.25** Use properties of prisms, pyramids, cylinders, cones, spheres, and hemispheres to solve problems. | **Measurement, 33-36**: Compute the area of composite geometric figures hen planning or visualization is required. | **Geometry, Geometric Measurement and Dimension:** 3) Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. |
| **3108.4.26** Describe and draw cross-sections (including the conic sections) of prisms, cylinders, pyramids, spheres, and cones. |  |  |
| **3108.4.30** Use right triangle trigonometry to find the lateral area (if possible), surface area, and volume of prisms, cylinders, cones, pyramids, spheres, and hemispheres. |  |  |